Deutsches Zentrum
DLR für Luft- und Raumfahrt

Potentials and challenges in the application of peridynamics for the determination of virtual allowables

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Motivated by ideas of molecular dynamics and to overcome the deficits of fracture mechanics, Stewart Silling developed the fundamental Peridynamics theory in the early 2000's as an alternative approach to the classical continuum mechanical modeling. In this theory the fundamental partial differential equations of the momentum conservation is replaced by an integral equation. Singularities at discontinuities are avoided.
The presentation gives an overview of the different modeling approaches within Peridynamics. At DLR the ordinary state based formulation was applied and an energy damage criterion was implemented to perform micromechanical investigations.
This current work will be presented. The current focus is on damage modelling of adhesives, verification and validation of models. A modeling framework for the description of complex mircomechanical models is also presented.